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**JUL 18 1994**

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

July 18, 1994

William F. Caton, Acting Secretary  
Federal Communications Commission  
1919 M Street, N.W., Room 222  
Washington, D.C. 20554

**EX PARTE OR LATE FILED**

**Re: Notice of Ex Parte Contact PP Docket No. 93-253**

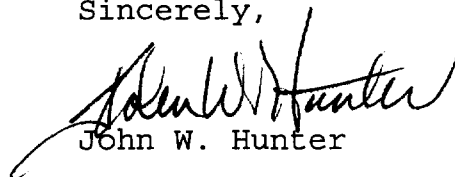
Dear Mr. Caton:

Pursuant to Section 1.1206 of the Commission's Rules, notice is hereby given of an ex parte communication regarding the above-referenced proceeding. The instant notice is being submitted in duplicate.

A series of E-mail communications concerning bid increments and bidding activity for the narrowband PCS auctions have been sent to a member of the Commission's staff. Copies of those communications are enclosed.

Please associate this material with the record in this proceeding on behalf of Paging Network, Inc.

Sincerely,

  
John W. Hunter

JWH:cpa  
Enclosure

cc: Evan Kwerel, Office of Plans & Policy

No. of Copies rec'd 0+1  
List A B C D E

# *University of Maryland*

Department of Economics, College Park, MD 20742-7211

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**Peter Cramton**

Associate Professor of Economics

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11 July 1994

**To:**

Dr. Evan Kwerel

Federal Communications Commission

Office of Plans and Policy

1919 M St NW

Washington, DC 20554

Fax (202) 632-1587

**Total Number of Pages:** 8

**From:**

Professor Peter Cramton

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**Comments:**

Here is the email I mentioned.

Sincerely yours,

*Peter Cramton*

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JUL 16 1994

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

To: EKWEREL @ SMTP (EKWEREL) {EKWEREL@fcc.gov}

Cc: cramton @ econ

From: John McMillan

Subject: bid increments

Date: 7/08/94 Time: 4:02p

Evan:

Some quick comments on Peter's bid-increment ideas (I will, however, give them some more thought).

I agree that the way to think about this is that it is a formal way of simulating what a skilled auctioneer does.

I agree with the five principles as stated on pp.2-3. There is a trade-off, however, with simplicity of rules, which might justify departing from one or more of these principles.

One question, though, about principle 5: while in general it is good for all rules to be announced in advance, it is not clear that there is any efficiency or revenue cost of not announcing bid increment adjustment in advance. How would bidder behavior be adversely affected if they couldn't predict bid increments?

16 percent seems a very big initial increment. There seems to be some risk that bidding will be choked off too early. For winner's curse reasons, we don't want to discourage bidding activity too early.

I am not sure how the bid-increment rule could be stated in the case of broadband licenses--what is the equivalent there of "32 valid bids"? A simple solution would be to have three bid increments, corresponding to the three phases of the mechanism. This would have the disadvantage of introducing a bit of discontinuity in the changes in bid increments (at variance with principle number 4 on p.3) but would have the advantage of simplicity.

John

John McMillan

IR/PS, UCSD, La Jolla, CA 92093-0519

phone: 619 534 5967 (office); 619 942 8154 (home)

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\*\*\*\*\*

To: "Kwerel, Evan", JMcMilla.SMTP @ SMTP (John McMillan) {jmcmillan@ucsd.edu}

From: Cramton, Peter

Subject: Re: bid increments

Date: 7/09/94 Time: 9:39a

Originated by: JMcMilla.SMTP @ SMTP (John McMillan) {jmcmillan@ucsd.edu} 7/08/94 4:02p

Replied by: CRAMTON 7/09/94 9:39a

John:

Thanks for your comments and fast response.

One minor revision to my proposal: It does not make sense to count waivers in the measure of bidding activity. I have revised the measure of bid activity to be "the number of new bids in the prior round across all licenses." I have added two sentences to the discussion of the activity measure: "Waivers should not be counted as new bids, since a waiver does not indicate a willingness to raise prices. Indeed, waivers may be used by bidders who are unwilling to bid under the current bid increment, but who are hopeful that the increment will fall in subsequent rounds."

I thank Preston McAfee for pointing out that waivers should not be included in the bid activity measure.

With respect to your initial reaction:

1. Announcing a plan is not critical. However, it does help bidders in developing strategies. The fewer surprises, the more orderly (and rational) the bidding. More importantly, it lessens the appearance that the FCC is acting in an arbitrary manner.

2. 16% is large, but it will fall in 1 round if bidding activity is choked off. The important information is revealed toward the end of the auction, when the serious bidders are deciding about exit. This plan assures that more time will be spent in the latter stages. The serious firms are not going to infer anything about values from the early exit of firms that don't have a nationwide strategy, but who came to the auction just in case the licenses go for pennies.

16% could be lowered to say 15% if the lower bound is raised to 5%. However, I believe it is better to have as low a lower bound as possible.

3. Although it is good to think about ways to adjust the increment for broadband, what is done for the nationwide auction should be what is best for the nationwide setting. I think this kind of method can be adapted to broadband. We should use the narrowband experience to design specific broadband procedures. The mta and bta narrowband auctions will be invaluable in this regard.

Thanks again for your thoughtful comments.

--Peter

\*\*\*\*\*

To: EKwerel @ SMTP (EKwerel) {EKwerel@fcc.gov}

Cc: Cramton @ econ

From: Robert Wilson

Subject: Peter Cramton's proposed narrow

Date: 7/09/94 Time: 12:53p

DATE: 9 July 1994

TO: Evan Kwerel, OPP, FCC

FROM: Robert Wilson

RE: Cramton proposal for narrowband-auction bid increments

Disclaimers: (1) I send this as a private party, since I am presently not employed by PacBell (since April 1, and recall that I ceased work on the auction design on November 27), although it is possible that later I will again be employed by them. I have not communicated with PacBell about this matter, and my remarks are not presently known or endorsed by them.

(2) I am not fully familiar with the material facts about the narrowband auction, and I have not had an opportunity to learn more about the design of the simulations conducted by Cramton. In particular, unfortunately I have seen none of the FCC orders regarding the narrowband auction and until reading Cramton's proposal today I was unaware of many of the proposed procedural aspects.

\* \* \* \* \*

My view is that Cramton has employed an appropriate methodology to establish a bid-increment plan that has a high probability of ensuring closure of the auction within the desired time-frame, without impairing the efficiency of the outcome. This is consistent with the affidavits submitted previously by my Milgrom and myself (in November) about how the details of the auction design should be determined, and about the use of the narrowband auction to establish the feasibility and effectiveness of the procedural rules. The only superior methodology I know would be an experiment in which the rule was tested in a laboratory setting with human subjects, but my understanding is that this possibility is not feasible at this stage.

It seems to me that the analysis and conclusions submitted by Cramton provide reasonable guidelines for setting the bid-increment parameters for the narrowband auction, provided that his assumptions are reasonably

accurate (which I am not prepared to judge). I had not been aware that the FCC would entertain a bid-increment rule of the 'complexity' of Table 1, page 4, but if this sort of tapered rule is deemed feasible operationally then I endorse its use: in general, the more the rule is tapered to allow graduated bid-increments in inverse relation to the activity level, the more one can expect the auction to proceed quickly and smoothly while retaining efficiency. The key feature of the Cramton design is that the bid-increment on *\*all\** licenses varies inversely with the activity on *\*all\** licenses; this imitates the common practice of auctioneers in single-item oral auctions, but extended in a blanket fashion to the multiple-item context. I foresee no serious incentive problems that might be engendered by such a rule, provided (as will be the case) it is accompanied by the activity rule. One could imagine a concerted effort by several or all bidders to avoid bidding to reduce the bid increment, but I see this as a remote possibility with little chance that it can materially affect the outcome adversely, especially given the consequences via the activity rule and the fact that the rule is reversible (if activity increases later then the bid-increment also increases). I have tried to foresee any unfavorable interactions between a tapered bid-increment rule and the (similarly tapered) activity rule, but provided the breakpoints (e.g., < 10 bids for shifting phases of the activity rule) of the activity rule coincide with some breakpoints of the bid-increment rule, it seems to me that actually they tend to reinforce each other favorably --- encouraging a quick movement to the vicinity of the final prices in the initial phase (which allows considerable shifting among substitute licenses by bidders), followed by a slower but more focused bidding in the ensuing phase that concentrates on the determination of the winner of each license.

A tapered bid-increment rule is also consistent with the suggestions in the earlier affidavit submitted by McAfee; as well as paragraphs 124-126 in the FCC's 2nd Report and Order. Using the linear rule proposed by Cramton suffices, and apparently his simulations indicate that his recommended parameter settings suffice to ensure a high probability of timely closure (I have not seen the construction of his simulations). The FCC had previously indicated in the 2nd Report and Order (124-126) that this would be a criterion for the selection of the bid-increment rule.

I think we should be grateful that someone with Cramton's insight and skills has volunteered to undertake this analysis, and grateful that he has pointed out the potential delays were the simple bid-increment rule used, as described on page 2. It would be a considerable public service if he were to conduct a similar analysis for the broadband auction, as suggested on page 5.

(I have been so uninformed about the auction design, and especially the narrowband-auction that I gather is nearly upon us, that I had been unaware of the tight 5-day schedule with hourly bids!)

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To: RWilson.SMTP @ SMTP (Robert Wilson) {FWILSON@GSB-YEN.STANFORD.EDU}  
Cc: "Kwerel, Evan"  
From: Cramton, Peter  
Subject: Re: Peter Cramton's proposed na  
Date: 7/09/94 Time: 4:58p

Originated by: RWilson.SMTP @ SMTP (Robert Wilson)  
{FWILSON@GSB-YEN.STANFORD.EDU} 7/09/94 12:53p  
Replied by: CRAMTON 7/09/94 4:58p  
Bob:

Thanks a million for your comments. The hourly, 5-day schedule is only for the narrowband. Much more time will be given to the broadband. I have used this procedure with real bidders (actual auction participants) supplemented with some simulated bidders. The predictions of the simulations were confirmed. Unfortunately, there is not time for extensive experimental tests, since the auction is only two weeks away.

In terms of complexity, I think that a linear rule tied to bid activity is about as simple as possible. From a bidders perspective, it is simpler than using large steps (say, 10% then 5%) because of the gaming that can occur near the transition. It is much simpler than having the FCC play with the increment in unspecified ways. Then each bidder must try to guess what the FCC may do in the future.

You are right that a key feature of the method is tying the increment on all licenses to the activity on all licenses. This is essential in the nationwide narrowband context, since all the licenses are good substitutes. Bidding activity on individual licenses will fluctuate wildly from round to round as the best value shifts from license to license.

Thanks again for your thoughtful and prompt comments!

--Peter

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To: CRAMTON @ econ  
Cc: FWILSON @ SMTP (FWILSON) {FWILSON@GSB-YEN.STANFORD.EDU}, EKwerel @ SMTP (EKwerel) {EKwerel@fcc.gov}  
From: Robert Wilson  
Subject: Re: Peter Cramton's proposed na  
Date: 7/09/94 Time: 2:52p

Dear Peter: I was impressed with the thoughtful job you had done. I quite agree with your observations in the second and third paragraphs above -- and I think it was insightful to realize that when licenses are all national and close substitutes, one can expect wild fluctuations in bids across licenses, so the best rule relies on the aggregate activity and applies uniformly to all licenses. I was very serious when I said in my note to Evan that it would be public service for you to extend this work to the broadband context -- in particular, it requires the numerical simulations to get the right parameters nailed down, and you may be the only one in a position to do that well in the next few months, and surely the most competent. (It would also ease anxieties at the FCC if there is well-reasoned evidence beforehand about the probable length of the broadband auction.)

I hope you are having an enjoyable summer; is there any chance you could join us for the last week of July, 26-28, when the SITE seminars are about Design of Markets and focused mainly on the PCS auction? I am near the end of my budget but I think I can still provide some travel expenses for you, like up to \$800. Let me know if you can come; in any case I will ask Lisa to mail a schedule of seminars to you.

Best regards. Bob

cc: Evan Kwerel -- Evan: are you still able to come to SITE or will the auction intervene? I am so ignorant that I do not know the dates of the auction -- when is it? Will it be covered by any media that we might get here (I once heard that there is some sort of closed-circuit

TV coverage of FCC meetings), or is there something like a bulletin board where we can follow the bidding? (My ignorance is related to the fact that I have not heard from PacBell for over three months, and with 2 exceptions they have not sent me any copies of FCC materials; and having signed in October a non-disclosure agreement, etc., with them I cannot now work with any other firm, so I am largely 'out of the loop'.) I do want especially to thank you for sending me a copy of the 2nd Report and Order, which I greatly appreciated, as well as your kind note that accompanied it.

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To: RWilson @ SMTP (Robert Wilson) {FWILSON@gsb-yen.stanford.edu}  
Cc: Cramton @ econ, EKwerel @ SMTP (EKwerel) {EKwerel@fcc.gov}  
From: R Preston McAfee  
Subject: Re: Peter Cramton's proposed na  
Date: 7/09/94 Time: 6:06p

Hi Guys:

I want to say, also as a private citizen not speaking on behalf of AirTouch Communications, that I appreciate the work that Peter put into the bid increment rule, and think it is a very clever and sensible rule for the simultaneous auctions of things with values that are similar to an order of magnitude, like the nationwide and regional narrowband auctions.

The only point I want to raise is that there is a potential problem applying such a rule to the broadband PCS or the MTA and BTA-level narrowband auctions. The problem arises when there are some licenses not worth very much compared to others, and some bidders interested only in these cheap licenses.

Suppose the opening price on Montana exceeds the value of Montana, and there are two bidders that want Montana, and they want nothing else. The bidders can submit bids below the initial opening price. With the increments set (in percentage terms) the same for all, these bidders are effectively unable to compete for the license (i.e. submit a bid higher than the minimum increment) and must use waivers to keep their eligibility. After 5 rounds, this runs out, and the license sells to the high bidder.

A cure for this was suggested by Wilson and Milgrom in a different context: permit bids below the minimum increment, which are deemed active only if no bids above the minimum increment are received, on a license by license basis.

This issue can't arise if the properties have "similar" values, that is, one is not, say 10 times less valuable than another.

I don't consider that I've thought through all the aspects of the application of Cramton's rule to MTA-sized properties, but I think it is a nice solution to the increment rule for the first two auctions. I agree with Bob's assessment that it enhances the activity rule to tie increments to overall activity.

A final point: it makes sense to have the increment rule vary with phases. Note that the transition from phase 1 to phase 2 should be accompanied by a significant increase in measured activity, mainly because bidders who could be active on part of there desired license set must now be active on more, or all, of it. It might be reasonable to have smaller increments per new bid in phase 2 as compared to phase 1. I

don't think this will matter significantly for the nationwide narrowband auctions. It could matter for the regionals.

I agree with Bob that Peter is uniquely positioned to study the increment rule for the regionals - he has the brains, the software, and the experience to do this best. Plus, I don't think AirTouch will pay me to do it...

Preston

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Preston:

Many thanks for your prompt and thoughtful comments.

You are right that more thought and analysis is required in extending the bid increment adjustment rule to the MTA and BTA context. You have also identified the problem: some licenses may be worth much more or less on a per pop basis, because of differences in population density across areas. The last paragraph of my note (bottom of page 5) is an initial thought on this matter: reduce the per pop increment in proportion to population density within the area. This is a crude, but simple adjustment. I also like the Milgrom-Wilson idea of allowing bids below the minimum increment, which count as activity if no bidder bids the minimum increment. However, such a rule could grossly extend the auction if allowed in the final stage. Hence, I would prefer allowing these sub-minimum bids only in stage 1 (and perhaps stage 2). In the final stage, bid increments would be mandatory and perhaps would be based only on the percentage increment. Then if Spokane had an absolute increment of \$100 but it never got above \$50 after stage 2, bids of \$52.50 would now be acceptable (assuming a 5% increment). Alternatively, the absolute increment could be adjusted in response to no activity on the license, such as cutting the increment in half with each round of no activity.

The extent to which bid increments on all licenses should be tied to bidding activity on all licenses depends on how close the licenses are as substitutes. It may be that at the MTA and BTA level, there are groups of licenses that have little value interactions across groups (say high density vs. low density). In this case, it would make sense to have bid activity and increments defined on a group basis. For the sake of simplicity, I hope that this will not be necessary. My guess is that the narrowband experience will be helpful in setting an appropriate bid increment rule for broadband.

I am not so concerned about your final point (at least for the nationwide auction): that there may be a burst of activity in the transition from stage 1 to stage 2, and so you might want smaller increments in stage 2 to compensate. To the extent bidders are adopting a "wait-and-see" strategy, there will be a burst of activity at the transition, causing the bid increment to rise. I do not see this as a problem. This is precisely what may be needed to get closure, especially if many firms are playing the wait-and-see strategy. If the increment turns out to be too steep, then activity will drop (with firms using waivers to hang in there) and the bid increment will be reduced appropriately. It is conceivable that bidding activity could oscillate a bit at the transition, but I view this as unlikely. I will think more about this potential problem, especially for the regional, MTA, and BTA auctions.

Thanks again for your most helpful comments.



--Peter

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Evan:

The copy of my "Adjusting the Bid Increment" note that I gave you at the conference does not have the final paragraph I mention above (Preston got a later version, which includes points he raised in a phone conversation we had on Friday). It reads as follows:

I have not yet extended this method to auctions for regional, MTA, or BTA licenses. I intend to do this in the near future. There are two potential difficulties.

1. Different licenses may have substantially different values in terms of MHz-pops, because of different population densities. Then setting the absolute increment equal across all licenses does not make sense. One way to resolve this problem is to assume that values are proportional to population density. If the absolute increment for the New York MTA is \$.04 per MHz-pop, then set the absolute increment for the Spokane MTA =  $$.04 \cdot (\text{pop density Spokane}) / (\text{pop density NY})$ . An alternative solution is to allow a bidder to bid below the minimum increment. Such a bid would be valid if and only if no bidder bid at or above the minimum increment. Otherwise, the bidder would need to use a waiver to continue participation.
2. It is not immediately obvious what the best measure of bidding activity is. Again activity should be a function of the number of new bids in the prior round across all licenses (perhaps population weighted).

Neither of these difficulties is present in the nationwide narrowband auction.

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I will file the revised version on Monday. Since all this email is directly based on what is in the note, I assume that I will not have to file this email. Let me know if I am wrong. Thanks a lot.

--Peter